DOINGWHATWORKS

Slideshow

FULL DETAILS AND TRANSCRIPT

Content for Tiers 2 and 3

May 2010

Topic: Response to Intervention in Elementary-Middle Math
Practice: Foundations of Arithmetic

Highlights

- Recommended sequence of benchmarks for math instruction based on National Mathematics Advisory Panel benchmarks
- Focus on whole numbers by the end of grade 3, including strategic counting, number composition, and place value
- Focus on understanding operations including multiplication and division by the end of grade 5
- Daily practice in developing fact fluency in interventions
- Focus on rational numbers in interventions for students in grades 4-8
- Explicit focus on solving word problems for students in all interventions

Full Transcript

Title slide: Content for Tiers 2 and 3

For students in Tiers 2 and 3 who are struggling in mathematics, it is important to focus expectations so that they master the basic proficiencies that are fundamental to mathematics understanding.

Slide 1: National Math Panel benchmarks

The National Mathematics Advisory Panel recommends a sequence of mathematics concepts and skills to be mastered across the elementary and middle grades before students can progress. These benchmarks should guide the mathematics content for students in Tier 2 and 3 interventions. It is important not to oversimplify the content of interventions.

See sample material: National Mathematics Advisory Panel: K–8 Benchmarks

Slide 2: Whole numbers and operations

An important benchmark is attaining proficiency in the addition and subtraction of whole numbers by the end of grade 3. To attain that goal, interventionists focus on developing students' understanding of concepts such as strategic counting, number composition, and the base-10 place value system.

Slide 3: Concepts and fluency

Small-group interventions provide the opportunity for multiple demonstrations with a variety of manipulatives and many opportunities for practice. Interventionists can check for understanding frequently and teach to mastery.

Slide 4: Explicit fact instruction

Tier 2 and Tier 3 intervention sessions should include daily practice to develop fact fluency. Games, drills, and flashcards are useful for practice, but students who are struggling with mathematics will need additional instruction. They will likely benefit from explicit instruction in strategies such as counting on or counting up and presentation of the relationships among facts such as fact families.

Slide 5: More complex whole numbers/operations

Another important benchmark is attaining proficiency with multiplication and division of whole numbers

by the end of grade 5. Students in Tiers 2 and 3 should understand the reasoning underlying methods of calculation. Eventually they should be able to derive facts in their heads by using the associative, commutative, and distributive principles.

Slide 6: Application of properties

Rather than relying on memorization, students can solve more complex facts using their understanding of number composition and the properties of arithmetic. In this example, students decompose the number 13 and then apply the distributive property.

Slide 7: Relationships among facts

As students in interventions study the relationships among facts, they become adept at composing and decomposing numbers, which is necessary for understanding the concepts behind algorithms. The same type of thinking is foundational for algebra and other mathematical ideas.

Graphic developed by Sybilla Beckmann

Slide 8: Content for Tiers 2 and 3

For students in grades 4 through 8, the National Mathematics Advisory Panel report recommends six benchmarks related to fluency with fractions, including decimals, percentages, ratios, and negative fractions. This includes extending the understanding of the place value system to decimals, representing and comparing rational numbers on number lines and with fraction strips, and understanding what types of problems are solved by operations with rational numbers.

Slide 9: Rational number benchmarks

By the end of grade 5, students should be proficient with comparing fractions, decimals, and percentages. They should be able to add and subtract fractions and decimals by the end of grade 5 and multiply and divide them by the end of grade 6.

Slide 10: Developing reasoning

In all cases, it is important to develop the lines of reasoning that prepare students to learn more advanced mathematics. Problem solving integrated into intervention lessons demonstrates and tests students' understanding of underlying concepts.

Graphic developed by Sybilla Beckmann

Slide 11: Word problems

Students in Tier 2 and 3 interventions will benefit from explicit teaching of how to solve word problems. Such lessons include instruction in the structure of word problems and the solutions that "match" different structures, how to depict or visualize problems, and how to separate irrelevant information from essentials of the problem structure. Practice should involve solving word problems from a wide variety of contexts.

See slideshow: Teaching Word Problem Structures

Slide 12: Core curriculum

Remember that it is more important to focus on the mastery of essential math proficiencies in Tier 2 and 3 interventions than it is to align the content of interventions with the core curriculum. This will likely mean focusing on fewer concepts in greater depth during interventions than in the Tier 1 math classroom.